WHAT MAKES MOUNTAINS SPECIAL FOR TODAY'S CARTOGRAPHERS? TOWARDS AN INTEGRATED CARTOGRAPHIC MOUNTAIN INFORMATION SYSTEM (MIS)

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The social and economic importance of mountain regions has been increasing in the last few years. A decrease in agriculture and a growing use of alpine areas as leisure parks can be observed in the service societies of Europe, North America and Japan. In Central and Southeastern Europe, the Alpine and other mountainous countries play a major role for transit traffic between Northern and Southern Europe and partly Eastern Europe. In third world countries the population pressure leads to a more intensive settlement and economic harnessing of mountain regions. Finally, the number of natural hazards with devastating consequences for man is increasing in all of these areas due to this pressure and partially due to climatic influences. Altogether, the combination of these developments will create an increased demand for economic, societal, cultural and scientific action in mountainous areas during this century.

Together with the growing importance of mountain areas, the demand for adequate cartographic base data with respect to its contents, application, graphic design and the media is also increasing. Especially the analysis and visualisation of a large spectrum of new themes requires new cartographic methods and approaches which go beyond classic topographic and thematic cartography. In this domain, cartographic research stands only at its beginnings.

Currently, also due to the reasons mentioned in the first paragraph, there is a demand for a new kind of topographic base-maps including novel data models as well as cartographic representation methods and media which allow flexible, standardised and user-centred access, analysis, visualisation and publishing of mountain-related themes. In today's fast living societies, the immediate and easy access to processed data and the interaction is of paramount importance. To solve the current and future problems in mountainous areas, mountain cartography and derived spatial methods will provide an important contribution.

The first intention of the proposed paper is to evaluate the cartographic modelling and visualisation demands of the user community with respect to broad range of spatial, mountain-related applications, as well as to assess new user groups and their demands. It is obvious that the different branches require specific techniques and technologies and that the printed map plays only a minor role and is replaced by distributed information systems with a multifunctional interface. Following this assessment, a basic infrastructure (adaptable toolbox) allowing the processing of such thematic data will be presented, with emphasis on the cartographic visualisation, interaction and publication.

The toolbox will be demonstrated by three applications developed a t the Institute of Cartography: The first two programmes combine an interactive learning platform with GIS and AIS (Atlas Information System) functionality. They deal with the zoning of potential rock-fall in the Swiss Alps and with a volcanological information system of the Greek island Nisyros. The third example is a Internet-based Information System about potential multihazards and multi-risks in an Alpine valley in Switzerland. All systems depend on a database where topographic SVG geometries and thematic records are stored. The user-friendly interface allows the access of especially designed analysis and visualisation functions.